SEQUENCE LISTING

<110> Reactive Surfaces
McDaniel, C. Steven

<120> Recombinant Organophosphorus Acid Anhydrase and Methods of Use

<130> RACT-00200

<140> Unknown
<141> 2002-12-23

<150> 07/928,540
<151> 1992-08-13

<150> 08/252,384
<151> 1994-06-01

<150> 07/344,258
<151> 1989-04-27

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35 40 45

Lys Ala Leu Ala Glu Lys Ala Val Arg Gly Leu Arg Arg Ala Arg Ala
50 55 60

EB Cont.

Ala Gly Val Arg Thr Ile Val Asp Val Ser Thr Phe Asp Ile Gly Arg
65 70 75 80

Asp Val Ser Leu Leu Ala Glu Val Ser Arg Ala Ala Asp Val His Ile
85 90 95

Val Ala Ala Thr Gly Leu Trp Phe Asp Pro Pro Leu Ser Met Arg Leu
100 105 110

Arg Ser Val Glu Glu Leu Thr Gln Phe Phe Leu Arg Glu Ile Gln Tyr
115 120 125

Gly Ile Glu Asp Thr Gly Ile Arg Ala Gly Ile Ile Lys Val Ala Thr
130 135 140

Thr Gly Lys Ala Thr Pro Phe Gln Glu Leu Val Leu Lys Ala Ala Ala
145 150 155 160

Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala
165 170 175

Ser Gln Arg Asp Gly Glu Gln Gln Ala Ala Ile Phe Glu Ser Glu Gly
180 185 190

Leu Ser Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp Asp
195 200 205

Leu Ser Tyr Leu Thr Ala Leu Ala Ala Arg Gly Tyr Leu Ile Gly Leu
210 215 220

Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn Ala Ser Ala
225 230 235 240

Ser Ala Leu Leu Gly Ile Arg Ser Trp Gln Thr Arg Ala Leu Leu Ile
245 250 255

EB
Conclude

Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln Ile Leu Val Ser Asn
260 265 270

Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val
275 280 285

Met Asp Arg Val Asn Pro Asp Gly Met Ala Phe Ile Pro Leu Arg Val
290 295 300

Ile Pro Phe Leu Arg Glu Lys Gly Val Pro Gln Glu Thr Leu Ala Gly
305 310 315 320

Ile Thr Val Thr Asn Pro Ala Arg Phe Leu Ser Pro Thr Leu Arg Ala
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Ser

SEQUENCE LISTING

<110> Reactive Surfaces, Ltd.

<120> Recombinant Organophosphorus Acid Anhydrase and Methods of Use

<130> RACT-00200

<140> Unknown
<141> 2003-01-02

<150> 07/928,540
<151> 1992-08-13

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<151> 1994-06-01

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Thr Ile Ser Glu Ala Gly Phe Thr Leu Thr His Glu His Ile Cys Gly

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144
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35 40 45

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192
Lys Ala Leu Ala Glu Lys Ala Val Arg Gly Leu Arg Arg Ala Arg Ala

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#3 cont

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288
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85 90 95

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336
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agg agt gta gag gaa ctc aca cag ttc ttc ctg cgt gag att caa tat
384
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Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala
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Ser Gln Arg Asp Gly Glu Gln Gln Ala Ala Ile Phe Glu Ser Glu Gly
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ttg agc ccc tca cgg gtt tgt att ggt cac agc gat gat act gac gat
   624
Leu Ser Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp Asp
        195                 200                 205

ttg agc tat ctc acc gcc ctc gct gcg cgc gga tac ctc atc ggt cta
   672
Leu Ser Tyr Leu Thr Ala Leu Ala Ala Arg Gly Tyr Leu Ile Gly Leu
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Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn Ala Ser Ala
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   816
Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln Ile Leu Val Ser Asn
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gac tgg ctg ttc ggg ttt tcg agc tat gtc acc aac atc atg gac gtg
   864
Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val
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atg gat cgc gtg aac ccc gac ggg atg gcc ttc att cca ctg aga gtg
   912
Met Asp Arg Val Asn Pro Asp Gly Met Ala Phe Ile Pro Leu Arg Val
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atc cca ttc gta cga gag aag ggc gtc cca cag gaa acg ctg gca ggc
   960
Ile Pro Phe Val Arg Glu Lys Gly Val Pro Gln Glu Thr Leu Ala Gly
305                 310                 315                 320

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Val
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Thr Ile Ser Glu Ala Gly Phe Thr Leu Thr His Glu His Ile Cys Gly
20 25 30

Ser Ser Ala Gly Phe Leu Arg Ala Trp Pro Glu Phe Phe Gly Ser Arg
35 40 45

Lys Ala Leu Ala Glu Lys Ala Val Arg Gly Leu Arg Arg Ala Arg Ala
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Ala Gly Val Arg Thr Ile Val Asp Val Ser Thr Phe Asp Ile Gly Arg
65 70 75 80

Asp Val Ser Leu Leu Ala Glu Val Ser Arg Ala Ala Asp Val His Ile
85 90 95

Val Ala Ala Thr Gly Leu Trp Phe Asp Pro Pro Leu Ser Met Arg Leu
100 105 110

Arg Ser Val Glu Glu Leu Thr Gln Phe Phe Leu Arg Glu Ile Gln Tyr
115 120 125

Gly Ile Glu Asp Thr Gly Ile Arg Ala Gly Ile Ile Lys Val Ala Thr
130 135 140

Thr Gly Lys Ala Thr Pro Phe Gln Glu Leu Val Leu Lys Ala Ala Ala
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Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala

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Ser Gln Arg Asp Gly Glu Gln Gln Ala Ala Ile Phe Glu Ser Glu Gly
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Leu Ser Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp Asp
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Leu Ser Tyr Leu Thr Ala Leu Ala Ala Arg Gly Tyr Leu Ile Gly Leu
210 215 220

Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn Ala Ser Ala
225 230 235 240

Ser Ala Leu Leu Gly Ile Arg Ser Trp Gln Thr Arg Ala Leu Leu Ile
245 250 255

Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln Ile Leu Val Ser Asn
260 265 270

Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val
275 280 285

Met Asp Arg Val Asn Pro Asp Gly Met Ala Phe Ile Pro Leu Arg Val
290 295 300

Ile Pro Phe Val Arg Glu Lys Gly Val Pro Gln Glu Thr Leu Ala Gly
305 310 315 320

Ile Thr Val Thr Asn Pro Ala Arg Phe Tyr Val Thr Asp Leu Ala Gly
325 330 335

Val

Protein Comparisons
Percent Identity

McDaniel vs Wild Lab	57.8%
McDaniel vs Serdar	59.5%
Serdar vs Wild Lab	100%

DNA Comparisons
Percent Identity

McDaniel vs Wild Lab	88.0%
McDaniel vs Serdar	83.7%
Serdar vs Wild Lab	99.6%

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Wild Lab.PRO Met ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- Ser 2
Serdar.pro   Met Gln Thr Arg Arg Val Val Leu Lys Ser Ala Ala Ala Ala Gly Thr Leu Leu Gly Gly Leu Ala Gly Cys Ala Ser Val Ala Gly Ser 30

McDaniel.pro Ser Ala Gln Ala Met Arg Ser Ile Arg Ala Arg ---- Pro Ile Thr Ile Ser Glu Ala Gly Phe Thr Leu Thr His Glu Asp Ile Ser Ala 58
Wild Lab.PRO Ile Gly Thr Gly Lys Arg Ile Asn Thr Val Arg Gly Pro Ile Thr Ile Ser Glu Ala Gly Phe Thr Leu Thr His Glu Arg Ile Cys Gly 32
Serdar.pro   Ile Gly Thr Gly Ser Arg Ile Asn Thr Val Arg Gly Pro Ile Thr Ile Ser Glu Ala Gly Phe Thr Leu Thr His Glu His Ile Cys Gly 60

McDaniel.pro Ala Arg Gln Asp ---------- ---------- Ser Cys Val Leu Gly Gln Ser Ser Ser Val Ala Gln Ser Ser Ser Gly Lys Gly Cys Glu Arg 83
Wild Lab.PRO Ser Ser Ala Gly Phe Leu Arg Ala Trp Pro Glu Phe Phe Gly Ser Arg Lys Ala Leu Ala Gly Lys Ala Val Arg Gly Leu Arg 60
Serdar.pro   Ser Ser Ala Gly Phe Leu Arg Ala Trp Pro Glu Phe Phe Gly Ser Arg Lys Ala Leu Ala Glu Lys Asn Val Arg Gly Leu Arg 88

McDaniel.pro Ile Ala Arg Gln Ser Gly Trp Arg Ala Asn Asp Cys Arg Cys Val Asp Phe Arg Tyr Arg Ser Arg Arg Gln Phe Ile Gly Arg Gly Phe 11
Wild Lab.PRO Arg Ala Arg Ala Ala Gly Val Arg Thr Ile Val Asp Val Ser Thr Phe Asp Ile Gly Arg Asp Val Ser Leu Leu Ala Glu Val Ser 89
Serdar.pro   Arg Ala Arg Ala Asn Gly Val Arg Thr Ile Val Asp Val Ser Thr Phe Asp Ile Gly Arg Asp Val Ser Leu Leu Ala Glu Val Arg 11

McDaniel.pro Ala Gly Cys Arg Arg Ser Tyr Leu Ala Ala Thr Gly Leu Trp Phe Asp Pro Pro Leu Ser Met Arg Leu Arg Tyr Val Glu Glu Leu Thr 14
Wild Lab.PRO Arg Ala Ala Asp Val His Ala Val Ala Ala Thr Gly Leu Trp Phe Asp Pro Pro Leu Ser Met Arg Leu Arg Ser Val Glu Glu Leu Thr 11
Serdar.pro   Arg Ala Ala Asp Val His Ile Val Ala Ala Thr Gly Leu Trp Phe Asp Pro Pro Leu Ser Met Arg Leu Arg Ser Val Glu Glu Leu Thr 14

McDaniel.pro ---- Leu Val Leu Pro Ala Val Arg Phe Asn Met Ala Ser Lys Tyr Thr Gly Ile Arg Ala Gly Ile Ile Lys Val Ala Thr Thr Gly Lys 17
Wild Lab.PRO Gln Phe Phe Leu Arg Glu Ile Glu Tyr Gly Ile Glu Asp ---------- Thr Gly Ile Arg Ala Gly Ile Ile Lys Val Ala Thr Thr Gly Lys 14
Serdar.pro   Gln Phe Phe Leu Arg Glu Ile Glu Tyr Gly Ile Glu Asp ---------- Thr Gly Ile Arg Ala Gly Ile Ile Lys Val Ala Thr Thr Gly Lys 17

McDaniel.pro Ala Thr Pro Phe Gln Glu Leu Val Leu Lys Ala Ala Ala Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala Ser 20
Wild Lab.PRO Ala Thr Pro Phe Gln Glu Leu Val Leu Lys Ala Ala Ala Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala Ser 17
Serdar.pro   Ala Thr Pro Phe Gln Glu Leu Val Leu Lys Ala Ala Ala Arg Ala Ser Leu Ala Thr Gly Val Pro Val Thr Thr His Thr Ala Ala Ser 20

McDaniel.pro Gln Arg Asp Gly Glu Arg Gly Arg Pro Pro Phe Leu Ser Pro Lys Leu Glu Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp 23
Wild Lab.PRO Gln Arg Asp Gly Glu Gln Gln Ala Ala Ile Phe Gln Ser Glu Gly Leu Ser Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp 20
Serdar.pro   Gln Arg Asp Gly Glu Gln Asn Ala Ala Ile Phe Ala Ser Glu Gly Leu Ser Pro Ser Arg Val Cys Ile Gly His Ser Asp Asp Thr Asp 23

McDaniel.pro Asp Leu Ser Tyr Leu Thr Ala Leu Leu ---- Arg Gly Tyr Leu Ile Gly Leu Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn 26
Wild Lab.PRO Asp Leu Ser Tyr Leu Thr Ala Leu Ala Ala Arg Gly Tyr Leu Ile Gly Leu Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn 23
Serdar.pro   Asp Leu Ser Tyr Leu Thr Ala Leu Ala Ala Arg Gly Tyr Leu Ile Gly Leu Asp His Ile Pro His Ser Ala Ile Gly Leu Glu Asp Asn 26

McDaniel.pro Ala Ser Ala Ser Pro Leu Leu Gly Ile Arg Ser Trp Gln Thr Arg Ala Leu Leu Ile Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln 29
Wild Lab.PRO Ala Ser Ala Ser Ala Leu Leu Gly Ile Arg Ser Trp Gln Thr Arg Ala Leu Leu Ile Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln 26
Serdar.pro   Ala Ser Ala Ser Ala Leu Leu Gly Ile Arg Ser Trp Gln Thr Arg Ala Leu Leu Ile Lys Ala Leu Ile Asp Gln Gly Tyr Met Lys Gln 29

McDaniel.pro Ile Leu Val Ser Asn Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val Met Asp Arg Val Asn Pro Asp Gly Met 32
Wild Lab.PRO Ile Leu Val Ser Asn Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val Met Asp Arg Val Asn Pro Asp Gly Met 29
Serdar.pro   Ile Leu Val Ser Asn Asp Trp Leu Phe Gly Phe Ser Ser Tyr Val Thr Asn Ile Met Asp Val Met Asp Arg Val Asn Pro Asp Gly Met 32

McDaniel.pro Ala Phe Ile His                                                                                                      32
Wild Lab.PRO Ala Phe Ile Pro Leu Arg Val Ile Pro Phe Leu Arg Glu Lys Gly Val Pro Gln Glu Thr Leu Ala Gly Ile Thr Val Thr Asn Pro Ala 32
Serdar.pro   Ala Phe Ile Pro Leu Arg Val Ile Pro Phe Leu Arg Glu Lys Gly Val Pro Gln Glu Thr Leu Ala Gly Ile Thr Val Thr Asn Pro Ala 35

McDaniel.pro                                                                                                                      32
Wild Lab.PRO Arg Phe Leu Ser Pro Thr Leu Arg Ala Ser                                                                              33
Serdar.pro   Arg Phe Leu Ser Pro Thr Leu Arg Ala Ser                                                                              36

Decoration 'Decoration #1': Shade (with black at 10% fill) residues that differ from McDaniel.pro.

Decoration 'Decoration #2': Box residues that differ from McDaniel.pro.
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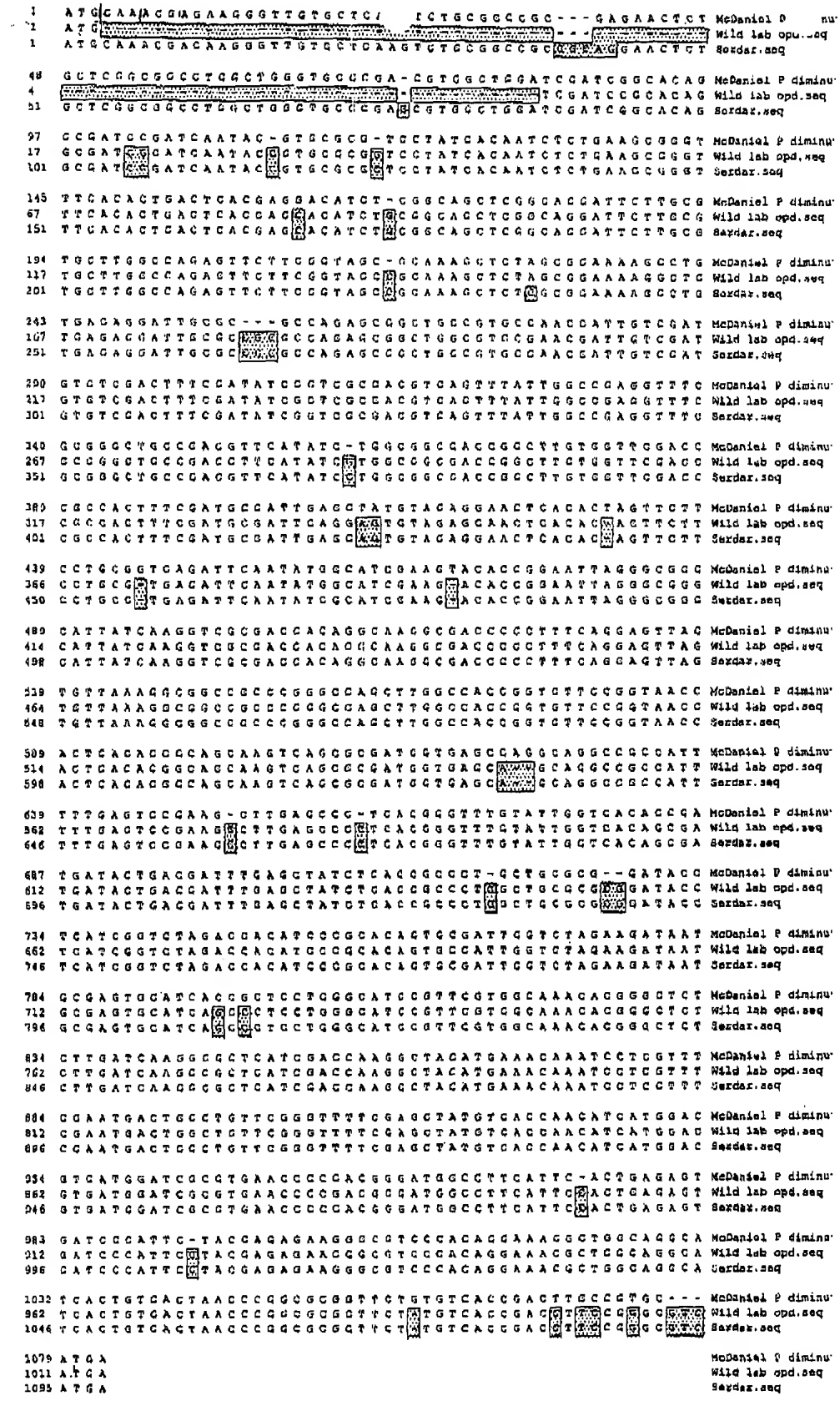

Decoration 'Decoration #1': Shade (with black at 10% fill) residues that differ from McDaniel P diminuta.seq.

Decoration 'Decoration #2': Box residues that differ from McDaniel P diminuta.seq.

Works Cited

McDaniel P. diminuta :
McDaniel,C.S., Harper,L.L. and Wild,J.R., Cloning and sequencing of a plasmid-borne gene (opd) encoding a phosphotriesterase, J. Bacteriol. 170 (5), 2306-2311 (1988). Gene Bank Accession Number: M20392

Oph-lab RC: Wild lab DNA sequence

Serdar: Serdar Sequence obtained from United States Patent and Trademark Office (uspto.gov) Patent Number 5,484,728

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